

*Note on the progress of the Second Geological Survey of Pennsylvania. By
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(Read before the American Philosophical Society, Jan. 19, 1883.)

The progress of the Geological Survey of this State, which interests so many of my fellow-members, both in America and in foreign countries, deserves some record on the minutes of this Society, the mother society of our country, and in former times the natural rendezvous of American physical and mechanical science.

I venture then to offer to the Society the following short account of the ground already covered by the survey, as exhibited by its publications since 1875, county by county, in alphabetical order; with occasional notes respecting those counties in which further field work must be done before reports upon them can be made ready for the press.

It is needless to say, that the already collected data withheld as yet from publication for this purpose must be added to express the sum total of actual work done in the State.

Adams County. Surveyed in 1874 and 1875 by P. Frazer. See Report **C** on Adams and York (1876), and Report **CC** on Adams, York, Cumberland and Franklin (1877). *Note.*—Instrumental lines were run in both counties. The special topographical survey of the the South mountains in Franklin and Adams, commenced in 1876, was continued through 1877, 1878, 1879, 1880, northwards to Pinegrove furnace. In 1881 and 1882 this survey was carried forward in Cumberland and York counties towards Mount Holy Springs; and in 1883 it will be nearly or quite completed, to the end of the mountain range at Dillsburg. Four sheets have been printed, but will not be published until the remaining sheets of the South Mountain map are also printed. The whole will then be published in atlas form with a report, and in rolls for the use of surveyors.

Allegheny. Surveyed in 1875 and 1876 by J. J. Stevenson and I. C. White. See Report **K** on Greene, Washington and South-west Allegheny counties (1876); Report **KK** on Fayette, Westmoreland and eastern Allegheny (1877); Report **Q** on Beaver and N. W. Allegheny (1877).

Armstrong. Surveyed in 1879 by W. G. Platt. Report **H 5** (1880).

Beaver. Surveyed in 1876 by I. C. White. See Report **Q** (1877).

Bedford. Surveyed in 1881 by J. J. Stevenson. Report **T 2** (1882).

Berks. Surveyed in 1880 by R. H. Sanders. A geological map of the limits of the formations and the dip and strike of all exposed rocks in the valley is prepared, but not yet published. The sheets of the great topographical survey of the limestone belt and mountains of Lehigh and

Northampton (commenced in 1875, and completed in the spring of 1882), includes that part of Berks county lying east of the Schuylkill, with the hills west of Reading (by E. V. D'Invilliers). The sheets of this map are all printed, and will be published shortly in the Atlas to Report **D 3** (1883). The report on Berks county will be published after further work has been done in the county.

Blair. Surveyed in 1877 by F. Platt. See Report with Atlas **T** (1881). The topographical map of Morrison's Cove, Canoe valley and Sinking valley, with the Frankstown and Hollidaysburg region, reaching to the summit of the Allegheny mountain at Galitzen, was commenced by R. H. Sanders in 1875 and completed in 1877. See the Atlas to Report **T**. *Note.*—The delay in publishing this report was caused by the necessity which arose of detailing the assistant geologist for work in various other counties, which required immediate attention in view of the publication of their reports.

Bradford. Surveyed in 1874 by A. Sherwood. See Report on Bradford and Tioga counties, **G** (1878). *Note.*—The delay in publishing was caused by the fact that Mr. Sherwood was ordered to confine his attention to the rocks below the coal. In 1877 Mr. F. Platt reported on the coal basins, and Report **G** was then published. Subsequent work by I. C. White and E. W. Claypole has discovered such considerable errors in the survey of 1874 that a revision of the whole eastern and middle parts of the county, north of Towanda creek, should be made.

Bucks. The southern belt of the county was surveyed in 1879 and 1880 by C. E. Hall. See Report on Philadelphia county and the southern parts of Montgomery and Bucks, **C 6** (1881). This report gives a detailed description of all the rocks of the county south of the red shale country. The northern edge of the county has been included in the Atlas sheets of the topographical map of the South mountains (Reading and Easton range) about to be published with Report **D 3** on Northampton county (1883). The largest part of Bucks county has not yet been surveyed.

Butler. *Southern half* surveyed in 1876 by I. C. White. See Report on Beaver, and parts of Allegheny and Butler counties, **Q** (1877). *Northern half* surveyed in 1878 by H. M. Chance. See Report on Northern Butler, **V** (1878).

Cambria. Surveyed in 1875, by F. and W. G. Platt. See Report on Cambria and Somerset District, Part 1, Cambria, **H 2** (1877).

Cameron. Surveyed in 1878, 1879 by C. A. Ashburner and A. W. Sheaffer. The report on Cameron, Elk and Forest was partly printed in 1881; but the publication was stopped by the transfer of the geologists to the Anthracite region, for organizing that survey. In 1883 there will be a revision of the work done in these three counties, and the Report **R 2** will then be published.

Carbon. The coal basin from Mauch Chunk to Tamaqua has been surveyed, and the sheets of maps and sections published to accompany Mr. Ashburner's first Anthracite report, **AA**, which will go to press in a few weeks. The survey of the Eastern Middle coal-field, commenced at Hazleton in 1881, has been continued uninterruptedly, and the sheets of the northern basins will be ready for press in 1883. The Beaver Meadow basin sheets will then be prepared. *Note.*—The geology of the Lehigh river below Mauch Chunk is described in the Report on Pike and Monroe counties, **G 6** (1882). The report on Carbon county requires further field work before it can be written.

Centre. Surveyed partially in 1880 and 1881 by F. Platt and W. G. Platt. Survey stopped by the resignation of both assistants. Mines re-visited and sampled for analysis in 1882 by A. S. McCreath. Survey to be completed in 1883 for Report **T 3**.

Chester. Surveyed in 1879 and 1880 by P. Frazer. Southern townships re-surveyed in 1882 by C. E. Hall. See Report **C 4** just ready to issue from the press. *Note.*—The delay in publication was occasioned by the resignation of Mr. Frazer and his residence in Europe.

Clarion. Surveyed in 1879 by H. M. Chance. Report **VV** (1880).

Clearfield. Surveyed in 1874 by F. Platt. See Report on the Clearfield and Jefferson District, **H** (1875). *Note.*—This report was based on the work of an inexperienced party at the commencement of the survey, and before the recent important developments of the coal-fields of Clearfield. A resurvey of the county has been repeatedly ordered by the Board of Commissioners, and several attempts have been made to obey the order; but the occupations of the Geological Assistants in the various districts of the State up to the winter of 1881 and 1882 prevented it. The delay in passing the last annual appropriation bill cost the survey the loss of the geologists who were successively detailed to make this revision, and there were no others to take their place. The revision will probably be made in 1883, and a new report be published.

Clinton. Surveyed in 1879 by H. M. Chance. See Report **G 4** (1880).

Columbia. Surveyed in 1882 by I. C. White. Report now in preparation, to be published in 1883. For the coal, see *Schuylkill* county.

Crawford. Surveyed in 1879 by I. C. White. See Report on Eric and Crawford, **Q 4** (1881).

Cumberland. Surveyed in 1878 by R. H. Sanders. County map exhibiting all exposed outcrops and mines prepared. No report yet written. All mines visited in 1880, and ores personally sampled and analyzed by Mr. McCreath. See Report **M 3** (1881). *Note.*—The peculiar character of

the Great valley required that the same kind of survey should be made of Franklin, Cumberland, Dauphin, Lebanon and Berks together. Each county has been similarly mapped by R. H. Sanders. All will be published at the same time. Mountain survey to be finished in 1883.

Dauphin. Surveyed in 1879-'80 by R. H. Sanders. County map exhibiting all exposed outcrops, mines and limits of formations, prepared. Mines personally visited and ores sampled in 1882 by A. S. McCreath. Report delayed for general revision in 1883, in connection with Lebanon and Berks. For the coal, see *Schuylkill* county.

Delaware. Surveyed in 1881 by C. E. Hall. See Report **C 5** (1883), to be published in the same volume with the report on Chester county, **C 4**. *Note.*—This publication has been delayed by the impossibility of preparing the illustrations for the report until after the report on Chester, with its illustrations, had been provided. Delaware was formerly a part of Chester, and its geology is dependent on that of Chester. The combined report has been printed and its maps, &c., are mostly printed. The whole will be published this winter.

Elk. Surveyed in 1877 and 1878 by C. A. Ashburner and A. W. Sheaffer. The maps and sections to accompany the report were printed in 1880. The publication of the report was stopped by the transfer of the geologist to the Anthracite region. The important developments made in the coal basins of this county since 1878 make it desirable to revise this survey. This will be done in 1883, after which the Report **R 2** will be published.

Erie. Surveyed in 1879 by I. C. White. See Report on Erie and Crawford, **Q 4** (1880).

Fayette. The western part surveyed in 1876, the eastern part in 1877, by J. J. Stevenson. See Report on Fayette and Westmoreland counties, **K 2** (1877), and Report on the Ligonier valley, **K 3** (1878). *Note.*—Report **L** (1876) gives the special survey of the Coke region.

Forest. Surveyed in 1879 by C. A. Ashburner and A. W. Sheaffer. The report on the coal areas and general geology will be published in 1883 in conjunction with the report (**R 2**) on Elk and Cameron counties. The wells of Forest county are described in the Report on Warren county, **I 4**, by J. F. Carll, now just ready for binding, and which will be published in February.

Franklin. Surveyed in 1879 by R. H. Sanders. County map exhibiting all exposed outcrops and mines prepared. Mines revisited in 1880, and ores sampled personally by A. S. McCreath, and analyzed. See Report **M 3** (1881). Northern part surveyed in 1877 by J. H. Dewees.

Instrumental line run in 1878 by C. W. Ames. South mountains instrumental surveyed in 1880-'81 by A. E. Lehman. Report delayed by the office work on instrumental surveys.

Fulton. Surveyed in 1882 by J. J. Stevenson. See Report on Bedford and Fulton, **T 2** (1882).

Greene. Surveyed in 1875 by J. J. Stevenson. See Report on Greene and Washington, **K** (1876). A special Report on the Collieries and Coal of the Monongahela valley will be made by J. S. Wall.

Huntingdon. Surveyed partially in 1874-'75 by J. H. Dewees, C. A. Ashburner and C. E. Billin. See Report on the Juniata District, **F** (1878). *Note.*—That part of this report relating to the Broad Top coal basin was reserved for future publication. The eastern end of the county was surveyed by Mr. Billin in connection with his topographical survey of the Seven mountains, some maps and sections of which have been printed. Mr. Billin's resignation early in 1879 stopped both the work and the report; but he is now completing the report for publication. Much work remains to be done in various parts of the county before a complete county report can be prepared.

Indiana. Surveyed in 1877 by W. G. Platt. See Report **H 4** (1878).

Jefferson. Surveyed in 1880 by W. G. Platt. See Report **H 6** (1881). *Note.*—The first partial survey of Jefferson in 1874-'75, was published in Mr. F. Platt's report of Clearfield and Jefferson, **H** (1875).

Juniata. Surveyed in 1876 by J. H. Dewees. *Note.*—This voluminous report required rewriting, for which there has been no sufficient opportunity. Maps of Juniata and Perry have been prepared. A resurvey of both counties by E. W. Claypole is in progress. Reports on both counties to be printed in 1883.

Lackawanna. Parts lying outside the coal, surveyed in 1882 by I. C. White. See forthcoming Report **G 7** (1883). Coal basin survey by C. A. Ashburner and corps, commenced in 1881 and continued through 1882 and onwards, proceeds from west to east, and will not reach Lackawanna until 1884. See Luzerne. *Note.*—For the east end, see Report **G 5**, I. C. White (1881).

Lancaster. Surveyed in 1877 by P. Frazer. See Report **C 3** (1880). *Note.*—Elaborate and difficult illustrations caused the delay.

Lawrence. Surveyed 1877 by I. C. White. Report **Q 2** (1878).

Lebanon. Surveyed in 1880-'81 by R. H. Sanders. County map prepared, exhibiting all local outcrops, limits of formations, mines, &c. Report delayed for work to be done in 1883.

Lehigh. Surveyed in 1874-'75 by F. Prime. See Reports on the Iron Ore district, **D** (1875), **D 2** (1878), with atlas. *Note.*—The delay of the last report was occasioned by the fact that the instrumental survey of the limestone valley belt and of the mountains continued from year to year, and was not finished until 1882. The survey of the slate belt in 1881 by R. H. Sanders will appear in the Report on Lehigh and Northampton **D 3**, with atlas, mostly printed and to be published shortly.

Luzerne. Parts lying outside the coal, surveyed in 1882 by I. C. White. See forthcoming Report **G 7** (1883). Coal basin survey by C. A. Ashburner and corps, commenced in 1881 and continued through 1882 and onwards. Western sheets ready for printing. Middle sheets in preparation. A special report will accompany the sheets of each division.

Lycoming. Surveyed in 1877 by A. Sherwood, and again in 1878-'79 by F. Platt. See Report on Lycoming and Sullivan, **G 2** (1880). *Note.*—The delay was caused by imperfections in the first survey, which could not be corrected sufficiently early in 1878.

McKean. Surveyed in 1876, 1877 and 1878, by C. A. Ashburner and A. W. Sheaffer. See Report **R** (1880). *Note.*—The length of this survey was due to the amount of instrumental work needful for its study; and the delay of its publication, to the careful preparation of its atlas of illustrations. The geology of Cameron, Elk and Forest was studied preliminarily in connection with that of McKean; and afterwards separately and in detail.

Mercer. Surveyed in 1878 by I. C. White. See Report **Q 3** (1879).

Mifflin. Surveyed by J. H. Dewees, C. A. Ashburner and C. E. Billin in 1874-'75-'76. See Report on Juniata District, **F** (1878). *Note.*—Kishicoquillis valley not surveyed.

Monroe. Surveyed in 1881 by I. C. White. See Report on Pike and Monroe, **G 6** (1882).

Montgomery. Southern part surveyed in 1879, 1880 by C. E. Hall. See Report on Philadelphia belt, **C 6** (1881). The rest of the county to be surveyed in 1883. (See *Bucks.*)

Montour. Surveyed in 1882 by I. C. White. To be published in Report **G 7** in 1883.

Northampton. Surveyed in 1876 by F. Prime. Slate belt surveyed in 1881 by R. H. Sanders. Mountain survey finished in 1881. Mountains revised in 1882 by C. E. Hall. See Report **D 3** mostly printed and soon to be issued, with Atlas. See *Lehigh.*

Northumberland. Surveyed partially in 1877 by C. E. Billin; again in 1882 by I. C. White. To be published in Report **G 7** in 1883. For the coal see *Schuylkill* county.

Perry. Surveyed in 1877 by J. H. Dewees. Surveyed again in 1882 by E. W. Claypole. Report to be published in 1883.—*Note.* The delay in publishing the report of 1877 was occasioned by the necessity for completely rewriting it. See *Juniata*.

Philadelphia. Surveyed in 1879, 1880. See Report **C 6** (1881).

Pike. Surveyed in 1881 by I. C. White. See Report on Pike and Monroe, **G 6** (1882).

Potter. Surveyed in 1876 by A. Sherwood. Resurveyed in 1879 by F. Platt. See Report **G 3** (1880).

Schuylkill. Anthracite survey commenced in 1881 by C. A. Ashburner and corps, continued through 1882 and onwards. Eastern sheets of Western Middle coal-field now in press; western sheets in preparation. Special report on each division to accompany the sheets. In 1884 the survey of the Southern coal-field from Tamaqua westward will be commenced. See *Carbon county*.

Snyder. Surveyed in 1876, 1877 by J. H. Dewees. See Report on Juniata District, **F** (1878). Surveyed again in 1878 by C. E. Billin, for map. Further field work before a county report can be published.

Somerset. Surveyed in 1879 by G. W. Platt. Report **H 3** (1877).

Sullivan. Surveyed in 1877 by A. Sherwood, and again in 1878-'79 by F. Platt. See Report on Lycoming and Sullivan, **G 2** (1880). The Coal basins will be resurveyed as part of the Anthracite survey.

Susquehanna. Surveyed in 1880 by I. C. White. See Report on Susquehanna and Wayne, **G 5** (1881).

Tioga. Surveyed in 1874 by A. Sherwood, and in 1877 by F. Platt. See Report on Bradford and Tioga, **G** (1878). See Note on *Bradford*.

Union. Surveyed in 1878 by C. E. Billin for map. Requires much field work before report can be published.

Venango. Surveyed in 1874 and onwards by J. F. Carll. See Reports on the Oil regions **I** (1875), **I 2** (1877), **I 3** (1880) and **I 4** (1883 just being issued).

Warren. Surveyed in 1874 and onwards, especially in 1882, by J. F. Carll. See Report on Warren county, **I 4** (1883 just issuing from the press). *Note.*—The long delay in reporting upon this county was occasioned by the abundance of its fossils; the extreme difficulty of establishing the correct order of its rocks; and the continued oil discoveries.

Washington. Surveyed in 1875 by J. J. Stevenson and I. C. White. See Report on Greene and Washington, **K** (1876). A special Report on the collieries of the Monongahela valley will be made by J. S. Wall.

Wayne. Surveyed in 1880 by I. C. White. See Report on Susquehanna and Wayne, **G 5** (1881).

Westmoreland. Surveyed in 1876 and 1877 by J. J. Stevenson. See Report on Fayette and Westmoreland **K 2** (1877), and on the Ligonier valley **K 3** (1878). *Note.*—Report **L** (1876) gives an account of a special survey of the Connellsville Coke region.

Wyoming. Surveyed in 1876 by A. Sherwood. Resurveyed in 1882 by I. C. White. See Report **G 7**, to be published in 1883.

York. Surveyed in 1874, 1875 and 1876 by P. Frazer. See Reports on Adams and York, **C** (1876) and **C 2** (1877).

Of the above mentioned Reports, **AA**, **C 3**, **D 2**, **D 3**, **I 3**, **R** and **T**, are accompanied by octavo Atlases, containing maps and sections. The following Reports have been published:

Report **A** (1875). A history of geological surveying in Pennsylvania.

Report **A 2**, on Waste in mining Anthracite, by F. Platt (1881).

Report **AC** on the mining of Anthracite coal, by H. M. Chance, will be put to press this winter (1883).

Report **E**, on Azoic rocks, by T. S. Hunt (1878).

Report **J**. Special report on Petroleum, 1875.

Reports **B**, **B 2**, **M**, **M 2**, **M 3** are the successively published reports of chemical analyses made for the Survey by F. A. Genth, S. P. Sadtler, F. A. Genth, Jr., A. S. McCreath and J. M. Stinson.

Report **N**. (1878) contains the Levels of the State railroads, canals, roads, &c., collected in 1875, 1876, 1877 by C. Allen. Materials for **N 2** are largely collected.

Reports **O**, **O 2** contain the catalogue of specimens collected from 1874 to 1880. **O 3** has not yet been prepared.

Report **P** (and Atlas) figures and describes the coal plants, studied by L. Lesquereux, from 1874 to 1880.

Report **P 2** describes the Permian plants of Greene county and West Virginia, by Fontaine and White (1880).

Report **P 3** containing new species of coal plants by Leo Lesquereux and descriptions of articulates and mollusks, by C. E. Beecher, James Hall and E. W. Claypole, will be published in 1883.

Report **Z** on the glacial moraines and gravels by H. C. Lewis, is nearly ready for the press.

The small hand-book or traveling atlas of geologically colored county maps is two thirds prepared, and will be finished in 1883.